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(54) Title: **METHOD AND APPARATUS FOR IMPROVED DETERMINATION OF SPATIAL NON-AGGLOMERATED MAGNETIC PARTICLE DISTRIBUTION IN AN AREA OF EXAMINATION**

(57) Abstract: The invention relates to a method to prevent or reduce agglomeration of magnetic particles, wherein the magnetic particles are exposed to a varying magnetic field, more in particular, there is provided a method to determine the spatial distribution of magnetic particles in an examination area of an object of examination with the following steps: a) Generation of an imaging magnetic field with a first sub-area with lower 15 magnetic field strength and a second sub-area with a higher magnetic field strength, b) Change of the spatial location of both sub-areas in the area of examination, c) Acquisition of signals that depend on the magnetization in the area of examination influenced by this change, and d) Evaluation of said signals to obtain information about the spatial distribution of the signals in the area of examination, wherein the magnetic particles before or during the determining of the spatial distribution are exposed to a varying magnetic field at least some of the time, such as to reduce or prevent agglomeration of magnetic particles. The invention further relates to an apparatus to determine the spatial distribution of magnetic particles. The invention further relates to magnetic particle compositions having improved imaging properties in the method according to the invention.

WO 2004/091398 A3

## INTERNATIONAL SEARCH REPORT

International Application No

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## A. CLASSIFICATION OF SUBJECT MATTER

IPC 7 A61B5/06 A61K49/18

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 A61B A61K

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal, INSPEC

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 5 370 901 A (TOURNIER HERVE ET AL) 6 December 1994 (1994-12-06) column 4, line 40 - column 5, line 40 -----	1
X	US 4 827 945 A (JOSEPHSON LEE ET AL) 9 May 1989 (1989-05-09) paragraphs [2.4.], [2.4.1.] -----	1
X	KAISER R ET AL: "Magnetic properties of stable dispersions of subdomain magnetite particles" JOURNAL OF APPLIED PHYSICS USA, vol. 41, no. 3, 1970, pages 1064-1072, XP002295575 ISSN: 0021-8979 cited in the application page 1065 ----- -/-	1

☒ Further documents are listed in the continuation of box C.☒ Patent family members are listed in annex.

## \* Special categories of cited documents:

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier document but published on or after the international filing date

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"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&amp;" document member of the same patent family

Date of the actual completion of the international search

9 September 2004

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International Application No

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## C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 4 849 210 A (WIDDER KENNETH J) 18 July 1989 (1989-07-18) column 3, line 5 - line 12 -----	1
A	WO 91/02811 A (IMMUNICON CORP) 7 March 1991 (1991-03-07) page 2, line 22 - page 3, line 26 -----	1

# INTERNATIONAL SEARCH REPORT

International application No.  
PCT/IB2004/050450

## Box II Observations where certain claims were found unsearchable (Continuation of item 2 of first sheet)

This International Search Report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☒ Claims Nos.: 2-21, 24  
because they relate to subject matter not required to be searched by this Authority, namely:  
Rule 39.1(iv) PCT - Method for treatment of the human or animal body by surgery
2. ☐ Claims Nos.:  
because they relate to parts of the International Application that do not comply with the prescribed requirements to such an extent that no meaningful International Search can be carried out, specifically:
3. ☐ Claims Nos.:  
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

## Box III Observations where unity of invention is lacking (Continuation of item 3 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

see additional sheet

1. ☐ As all required additional search fees were timely paid by the applicant, this International Search Report covers all searchable claims.
2. ☐ As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.
3. ☐ As only some of the required additional search fees were timely paid by the applicant, this International Search Report covers only those claims for which fees were paid, specifically claims Nos.:
4. ☒ No required additional search fees were timely paid by the applicant. Consequently, this International Search Report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

1

Remark on Protest

- ☐ The additional search fees were accompanied by the applicant's protest.
- ☐ No protest accompanied the payment of additional search fees.

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

This International Searching Authority found multiple (groups of) inventions in this international application, as follows:

1. claim: 1

A method to prevent or reduce agglomeration of magnetic particles wherein the magnetic particles are exposed to a varying magnetic field.

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2. claims: 2-22

A method and an apparatus to determine the spatial distribution of magnetic particles in an examination area.

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3. claims: 23, 24

Magnetic particle composition having a particular magnetization curve and its use.

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FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

Continuation of Box II.1

Claims Nos.: 2-21, 24

Rule 39.1(iv) PCT - Method for treatment of the human or animal body by surgery

# INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/IB2004/050450

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### Information on patent family members

International Application No

PCT/IB2004/050450

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